

Brocade 4Gb SAN Switch for HP p-Class BladeSystem installation guide

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Brocade 4Gb SAN Switch for HP p-Class BladeSystem installation guide

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About this guide

This installation guide provides information to help you configure the Brocade 4Gb SAN Switch for HP p-Class BladeSystem (referred to hereafter as the 4Gb SAN Switch).

“About this Guide” topics include:

- [Intended audience](#), page 7
- [Related documentation](#), page 7
- [Document conventions and symbols](#), page 8
- [HP technical support](#), page 10

Intended audience

This book is intended for use by system administrators and technicians who are experienced with the following:

- Configuration aspects of customer Storage Area Network (SAN) fabric
- Customer host environment, such as Microsoft® Windows® or Linux®
- Web Tools graphical user interface (GUI) for configuring the switches through a supported web browser

Related documentation

4Gb SAN Switch-related documents and other SAN infrastructure documentation, including white papers and best practices documents, are available at www.hp.com/go/san.

Document conventions and symbols

Table 1 Document conventions

Convention	Element
Medium blue text: Figure 1	Cross-reference links and e-mail addresses
Medium blue, underlined text (http://www.hp.com)	Web site addresses
Bold font	<ul style="list-style-type: none">• Key names• Text typed into a GUI element, such as into a box• GUI elements that are clicked or selected, such as menu and list items, buttons, and check boxes
<i>Italics font</i>	Text emphasis
Monospace font	<ul style="list-style-type: none">• File and directory names• System output• Code• Text typed at the command line
<i>Monospace, italic font</i>	<ul style="list-style-type: none">• Code variables• Command-line variables
Monospace, bold font	Emphasis of file and directory names, system output, code, and text typed at the command line

Symbols in text



WARNING! Indicates that failure to follow directions could result in bodily harm or death.



CAUTION: Indicates that failure to follow directions could result in damage to equipment or data.



IMPORTANT: Provides clarifying information or specific instructions.



NOTE: Provides additional information.



TIP: Provides helpful hints and shortcuts.

Equipment symbols

Any enclosed surface or area of the equipment marked with these symbols indicates the presence of electrical shock hazards. Enclosed area contains no operator serviceable parts.



WARNING! Any enclosed surface or area of the equipment marked with these symbols indicates the presence of electrical shock hazards. Enclosed area contains no operator serviceable parts.
To reduce the risk of personal injury from electrical shock hazards, do not open this enclosure.



WARNING! Any RJ-45 receptacle marked with these symbols indicates a Network Interface Connection.
To reduce the risk of electrical shock, fire, or damage to the equipment, do not plug telephone or telecommunications connectors into this receptacle.



WARNING! Any surface or area of the equipment marked with these symbols indicates the presence of a hot surface or hot component. If this surface is contacted, the potential for injury exists.
To reduce the risk of injury from a hot component, allow the surface to cool before touching.



WARNING! Power Supplies or Systems marked with these symbols indicate the equipment is supplied by multiple sources of power.
To reduce the risk of injury from electrical shock, remove all power cords to completely disconnect power from the system.



WARNING! Any product or assembly marked with these symbols indicates that the component exceeds the recommended weight for one individual to handle safely.
To reduce the risk of personal INJURY or damage to the equipment, observe local occupational health and safety requirements and guidelines for manual material handling.

HP technical support

Telephone numbers for worldwide technical support are listed on the HP web site:
<http://www.hp.com/support/>.

Collect the following information before calling:

- Technical support registration number (if applicable)
- Product serial numbers
- Product model names and numbers
- Applicable error messages
- Operating system type and revision level
- Detailed, specific questions

For continuous quality improvement, calls may be recorded or monitored.

HP strongly recommends that customers sign up online using the Subscriber's choice web site:
<http://www.hp.com/go/e-updates>.

- Subscribing to this service provides you with email updates on the latest product enhancements, newest versions of drivers, and firmware documentation updates as well as instant access to numerous other product resources.
- After signing up, you can quickly locate your products by selecting **Business support** and then **Storage** under Product Category.

HP storage web site

The HP storage web site has the latest information on this product:
<http://www.hp.com/country/us/eng/prodserv/storage.html>. From this web site, select the appropriate product or solution.

HP-authorized reseller

For the name of your nearest HP-authorized reseller:

- In the United States, call 1-800-345-1518.
- Elsewhere, visit <http://www.hp.com> and click **Contact HP** to find locations and telephone numbers.

Helpful web sites

For other product information, see the following HP web sites:

- <http://www.hp.com>
- <http://www.hp.com/go/bladeSystem>
- <http://www.hp.com/go/support/>
- <http://www.docs.hp.com>

1 Overview

The 4Gb SAN Switch is a FC switch that supports link speeds of up to 4 Gb/sec. The 4Gb SAN Switch can operate in a fabric containing multiple switches or as the only switch in a fabric.

This chapter provides the following information:

- [4Gb SAN Switch features](#), page 13
- [4Gb SAN Switch characteristics](#), page 16
- [ISL trunking groups](#), page 17
- [Supported optional features](#), page 18
- [Optional hardware kits](#), page 19

4Gb SAN Switch features

The 4Gb SAN Switch provides the following features:

- Passive air cooling
- 256 MB compact flash
- Eight internal 2 Gb/sec FC server Blade ports (2 Gb/sec default speed) with the following characteristics:
 - Automatic negotiation to the highest common speed of all servers connected to port
 - Universal and self-configuring ports, which are capable of becoming an F_Port (fabric enabled) or FL_Port (fabric loop enabled)
- Four external 1/2/4 Gb/sec FC small form-factor pluggable (SFP) ports, with the following characteristics:
 - Automatic negotiation to the highest common speed of all devices connected to port
 - Port interface-compatible SFP transceivers, both short wavelength (SWL) and long wavelength (LWL)
 - Universal and self-configuring ports, which are capable of becoming an F_Port (fabric enabled), FL_Port (fabric loop enabled), or E_Port (expansion port)
- One RS-232 mini serial port, designed to connect to a Data Terminal Equipment (DTE) port

- One 10/100 Mb/sec Ethernet port with an RJ-45 connector
- The following light-emitting diodes (LEDs):
 - Power status
 - Switch status
 - Ethernet status
 - Port status and port speed for each port
- Voltage monitoring
- Temperature monitoring
- Real-time clock
- Manufacturing SEEPROM
- SFP port monitoring
- 3.3V power supplied and controlled by the installed Interconnect switch
- Identification to HP chassis management via HP specified SEEPROMs

4Gb SAN Switch redundancy

Two 4Gb SAN Switches can be installed in an HP p-Class BladeSystem for redundancy. One switch can be mounted on the back of the Interconnect switch on the left side of the Blade enclosure, and one can be mounted on the back of the Interconnect switch on the right side of the enclosure. Each switch can provide a FC port connection to all of the servers in the enclosure that have FC connections to the Interconnect Switch. SAN Switch availability with respect to power supply consideration is equal to or better than the server blades they support in the enclosure.

4Gb SAN Switch licensing

The 4Gb SAN Switch comes configured with one of three license options that complement existing HP product lines. Some 4Gb SAN Switches come with licenses that place limits on the number of domains that can be used. The three fabric licenses are:

- Brocade 4Gb SAN Switch for HP BladeSystem, base, which includes Zoning and Web Tools and 2-switch support in a fabric
- Brocade 4Gb SAN Switch for HP BladeSystem, full-fabric
- Brocade 4Gb SAN Switch for HP BladeSystem, full-fabric, Power Pack

You can upgrade the 4Gb SAN Switch products by purchasing optional licenses; refer to the *HP StorageWorks Fabric OS 5.0 procedures user guide* to learn how to upgrade a license.

To determine the type of licensing included with your 4Gb SAN Switch, use the `licenseshow` command.

```
switch:root> licenseshow
```

```
XXXnnXXnXnnXXX:
```

```
    Fabric Watch license
```

```
    Release v5.0 license
```

```
XXXnnXXnXnnXXX:
```

```
    Zoning license
```

```
XXXnnXXnXnnXXX:
```

```
    Web license
```

```
XXXnnXXnXnnXXX:
```

```
    2 Domain Fabric license
```



4Gb SAN Switch characteristics

The following subsections describe the physical characteristics of the 4Gb SAN Switch and some important requirements for proper operation.

Port side of the 4Gb SAN Switch

Figure 1 diagrams the ports of the 4Gb SAN Switch.

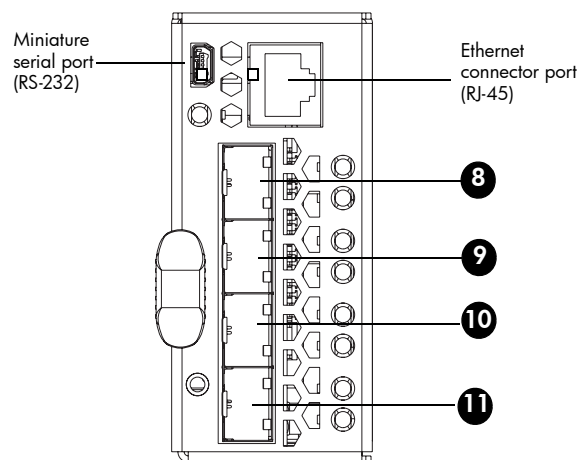


Figure 1 4Gb SAN Switch external ports

Ports 8, 9, 10, and 11 are the external ports of the 4Gb SAN Switch that use SFP transceivers. See [Table 2](#).

Table 2 External ports of the 4Gb SAN Switch

Port number	Description
8	FC switch port 8
9	FC switch port 9
10	FC switch port 10
11	FC switch port 11

Ports 0, 1, 2, 3, 4, 5, 6, and 7 are the 4Gb SAN Switch's logical internal ports that connect to the eight server bays in the enclosure via the enclosure signal backplane. Server bay 1 is connected to Switch Port 0, Server bay 2 is connected to Switch port 1, and so forth. See [Table 3](#).

Table 3 Logical internal ports of the 4Gb SAN Switch

Server bay	Switch port
1	0
2	1
3	2
4	3
5	4
6	5
7	6
8	7

The rear side of the 4Gb SAN Switch connects to the HP p-Class BladeSystem I/O Blade (hereafter referred to as the Interconnect switch) to access the signal backplane for completion of a FC link connection to each server bay. Blowers inside the Interconnect switch push forced air for cooling through the 4Gb SAN Switch to exhaust at the rear of the enclosure.



NOTE: You can find a complete descriptions along with locations and interpretations of the 4GB SAN Switch LEDs in "[Interpreting LED activity](#)" on page 38.

ISL trunking groups

If your 4Gb SAN Switch is licensed for interswitch link (ISL) trunking, use the trunking groups available on the switch.

The FC ports are numbered from right to left, and are part of the same ISL trunking group. The trunking group consists of the four ports shown in [Figure 1](#).



NOTE: ISL Trunking is optional software that allows you to create trunking groups of ISLs between adjacent switches. ISL trunking is available on the Brocade 4Gb SAN Switch for HP BladeSystem, Power Pack, or by purchasing the optional license as described in the following section. For more information about trunking, refer to the *HP StorageWorks Fabric OS 5.0 features overview*.

Supported optional features

The 4Gb SAN Switch includes the following optional software, which can be activated by purchasing the corresponding license key.

- Remote Switch
- Fabric Manager
- Secure Fabric OS
- ISL Trunking
- Fabric Watch
- Advanced Performance Monitoring
- Extended Fabrics

The 4Gb SAN Switch comes configured with a base 2-domain license, which includes the Advanced Zoning and Web Tools features. If you purchased a 4Gb SAN Switch for HP p-Class BladeSystem Power Pack, it includes the following optional software.

- ISL Trunking
- Fabric Watch
- Advanced Performance Monitoring
- Extended Fabrics

For information on any of these features, refer to the *HP StorageWorks Fabric OS 5.0 features overview*.

Optional hardware kits

Table 4 lists optional hardware kits that support the 4Gb SAN Switch.

Table 4 Available hardware

Accessory	Part number
Short wavelength SFP, 4Gb, 150m at 4Gb	A7446A
Long wavelength SFP, 10 km 2Gb	A6516A* or 300835-B21**
Long wavelength SFP, 35 km 2Gb	300836-B21**
2 m LC-to-LC FC cable	C7524A*
2 m LC-to-LC multimode FC cable	221692-B21**
16 m LC-to-LC FC cable	C7525A*
5 m LC-to-LC multimode FC cable	221692-B22**
50 m LC-to-LC FC cable	C7526A*
15 m LC-to-LC multimode FC cable	221692-B23**
200 m LC-to-LC FC cable	C7527A*
30 m LC-to-LC multimode FC cable	221692-B26**
50 m LC-to-LC multimode FC cable	221692-B27**
2 m LC-to-SC FC cable	C7529A*
2 m LC-to-SC multimode FC cable	221691-B21**
16 m LC-to-SC FC cable	C7530A*
5 m LC-to-SC multimode FC cable	221691-B21**
15 m LC-to-SC multimode FC cable	221691-B23**
30 m LC-to-SC multimode FC cable	221691-B26**
50 m LC-to-SC multimode FC cable	221691-B27**

Table 4 Available hardware (continued)

Accessory	Part number
SC-female-to-SC-female adapter	C7534A*
2 m LC-male-to-SC-male adapter kit	C7534A*

* Premerger HP part number

** Premerger Compaq part number

2 Installing the 4Gb SAN Switch

This chapter provides the following information:

- [Shipping carton contents](#), page 22
- [Installation and safety considerations](#), page 22
- [Installing the signal conditioning card](#), page 24
- [Installing the 4Gb SAN Switch](#), page 25
- [Server FC Port Connections](#), page 28
- [Connecting the serial cable](#), page 28
- [Configuring the 4Gb SAN Switch](#), page 29

Shipping carton contents

Figure 2 and Table 5 list the shipping carton contents for the 4Gb SAN Switch kit.

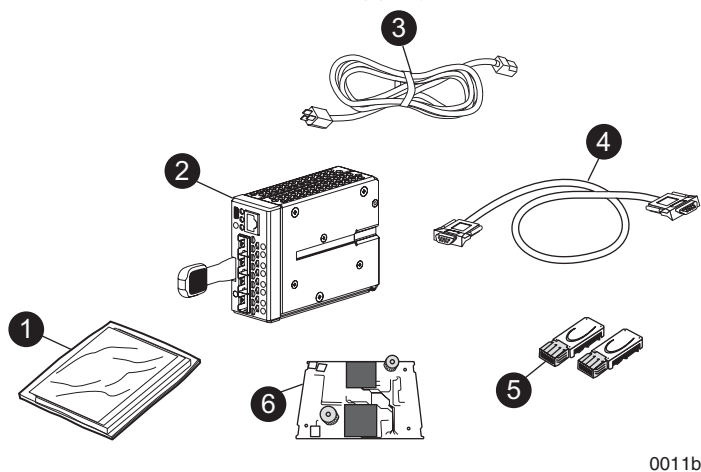


Figure 2 Shipping carton contents

Table 5 Shipping carton contents

Item Number	Description
❶	One HP Brocade 4Gb SAN Switch for HP p-Class BladeSystem quick setup instructions
❷	One 4Gb SAN Switch
❸ and ❹	One 10-inch miniature serial cable and one RS-232 Serial cable
❺	Two 4Gb short wavelength (SWL) small form-factor pluggable (SFP) optical transceivers
❻	One HP ProLiant BL p-Class FC signal conditioning card

If necessary, convert this RS-232 cable to an RJ45 serial connector by removing the adapter on the end of the cable.

Installation and safety considerations

HP recommends installing the 4Gb SAN Switch into the back of the HP p-Class BladeSystem enclosure with the Interconnect switch power off.

Electrical considerations

The 4Gb SAN Switch receives power from the Interconnect switch. For power information, refer to "[Technical specifications](#)" on page 51.

Environmental considerations

Ensure proper cooling and ventilation by verifying the following:

- Verify that the air vents on the Interconnect switch and the 4Gb SAN Switch are not blocked or restricted.
- Verify that the ambient air temperature at the front of the enclosure does not exceed 35°C (95°F) while the switch is operating.

Installing the signal conditioning card

1. Power down the Interconnect switch.
2. Remove the Interconnect switch by releasing the latch (1 and 2 in [Figure 3](#)) on the front and sliding it out of the enclosure (3).

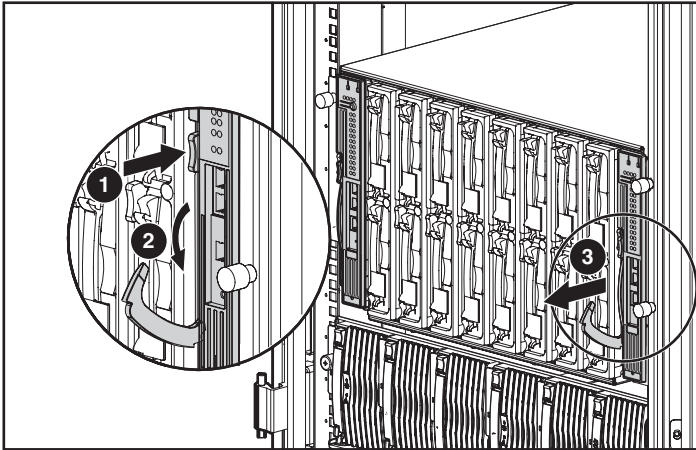


Figure 3 Interconnect switch removal

3. Remove the cover of the Interconnect switch by loosening the thumbscrews (see [Figure 4](#)).

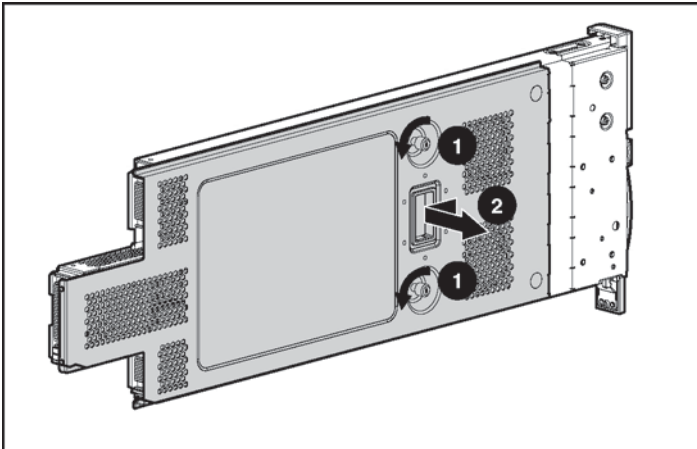


Figure 4 Removing the cover of an Interconnect switch

4. Install the FC signal conditioning card if one is not already installed. See [Figure 5](#).

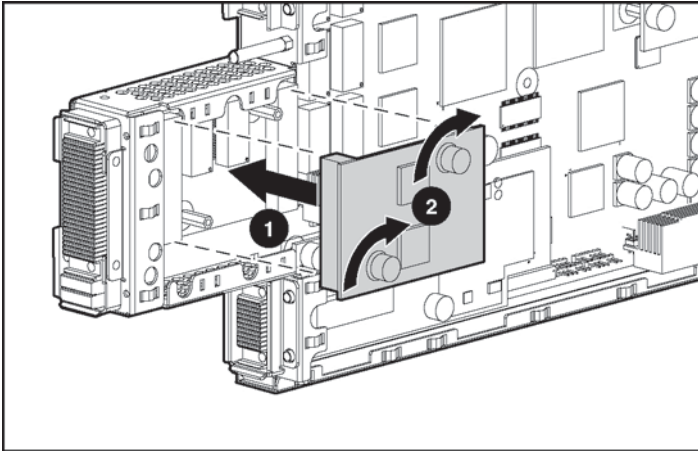


Figure 5 FC signal conditioning card installation

5. Replace the cover of the Interconnect switch and insert the Interconnect switch back into the enclosure.

Installing the 4Gb SAN Switch



IMPORTANT: Hot plugging a SAN Switch into an Interconnect switch may result in the temporary loss of network communication for the server blade network ports connected through that particular Interconnect switch. For continued LAN communications, redirect services and applications to the network ports connected through the redundant Interconnect switch in the enclosure.



CAUTION: Do not connect the switch to the LAN network until the IP address is correctly set. For instructions on how to set the IP address, see ["Set the IP address"](#) on page 30.

To install the 4Gb SAN Switch, follow this procedure:

1. Unpack the 4Gb SAN Switch and verify that all conditions listed in ["Installation and safety considerations"](#) on page 22 are met.



CAUTION: Do not block the 4Gb SAN Switch air vents.

2. Remove the protective foam from the connector guide pins on the back of the 4Gb SAN Switch.

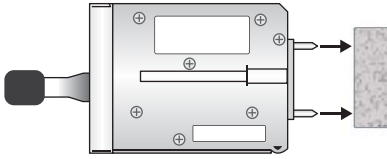


Figure 6 Removing the protective foam from the connector guide pins.

3. Plug the 4Gb SAN Switch into the back of the BladeSystem server enclosure; it will mate with the installed Interconnect switch. Be sure that the handle of the 4Gb SAN Switch is on the left when inserting the 4Gb SAN Switch and that the handle latch is fully engaged after installation. See [Figure 7](#).

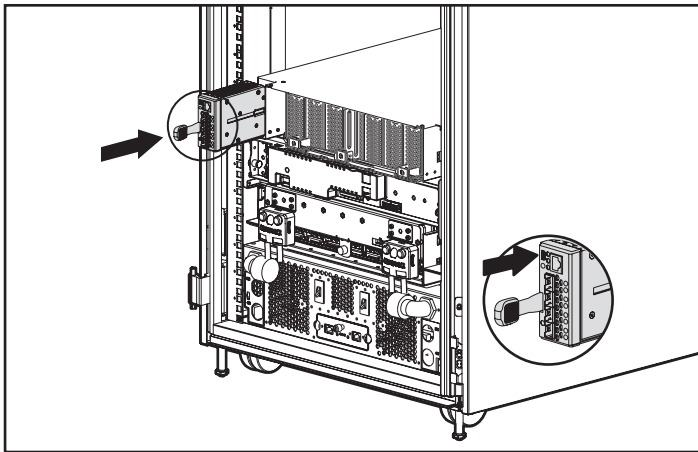


Figure 7 Installing the 4Gb SAN Switch

4. Install the transceivers and cable into the 4Gb SAN Switch (see [Figure 8](#)):
 - a. Insert the SFP transceivers (1) into the FC switch ports. Install protective dust plugs on transceivers without optical cables attached to prevent damage and contamination.

- b. Insert the optical cable (2) into the SFP transceiver. When fully seated, both the transceiver and the cable click into place.

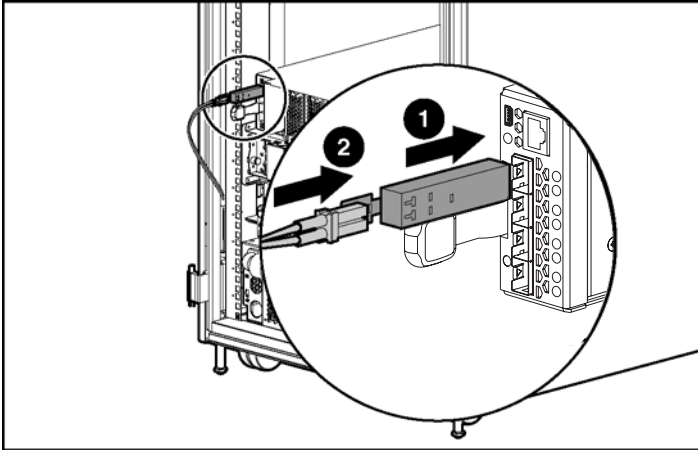


Figure 8 Installing an SFP transceiver(1) and optical cable (2)



NOTE: The minimum bend radius for a 50-micron fiber optic cable is 2 inches under full tensile load and 1.2 inches with no tensile load. Because they are easily overtightened, tie wraps are not recommended for optical cables.

The cable connectors are keyed to ensure correct orientation. Orient a cable connector so that the key (ridge on one side of connector) aligns with the slot in the transceiver, and insert the cable into the transceiver until the latching mechanism clicks. If a cable does not install easily, ensure it is correctly oriented. For instructions specific to cable type, refer to the cable manufacturer's documentation.

The cables used in trunking groups must meet specific requirements. For a list of these requirements, refer to the *HP StorageWorks Fabric OS 5.0 features overview*.

Server FC Port Connections

The 4 Gb SAN Switch port connections to all blade servers except the BL40p are made through embedded pathways in the enclosure hardware. These require no transceivers or optical cables.

The BL40p uses a standard HBA with optical transceivers. These ports are available at the rear of the enclosure, and must be connected to external ports of the 4 Gb SAN Switch using transceivers and optical cables.

Connecting the serial cable

Before you can begin configuring the 4Gb SAN Switch, you must establish a connection to your workstation via the serial port. To make a serial connection:

1. Insert the miniature serial connector of the 10-inch adapter cable into the port side of the 4Gb SAN Switch.
2. Connect the other end of the 10-inch adapter cable to the serial cable.
3. Connect the serial cable to an RS-232 serial port on the workstation.



NOTE: If the serial port on the workstation uses an RJ-45 connector instead of an RS-232 connector, remove the adapter on the end of the serial cable and insert the exposed RJ-45 connector into the RJ-45 serial port on the workstation.

4. Disable any serial communication programs running on the workstation.
 5. Open a terminal emulator application (such as HyperTerminal on a PC or TERM in a UNIX[®] environment) and configure the application as follows:
- In a Windows environment, make the following selections:

Bits per second	9600
Databits	8
Parity	None
Stop bits	1
Flow control	None

- In a UNIX environment, type the following string at the prompt:

```
tip /dev/ttyb -9600
```

Recommendations for cable management

The minimum bend radius for a 50-micron cable is 2 inches under full tensile load and 1.2 inches with no tensile load.

Cables can be organized and managed in a variety of ways. For example, using cable channels on the sides of the cabinet or patch panels for cable management. Following is a list of recommendations:

- Plan for the rack space required for cable management before installing the switch.
- Leave at least three inches of slack for each port cable. This provides room to remove and replace the switch and helps prevent the cables from being bent to less than the minimum bend radius.
- If you are using ISL Trunking, consider grouping cables by trunking groups. The cables used in trunking groups must meet specific requirements, as described in the *HP StorageWorks Fabric OS 5.0 features overview*.
- For easier maintenance, label the fiber optic cables and record the devices to which they are connected.
- Keep LEDs visible by routing cables away from the LEDs.
- Do not use cable ties on fiber optic cables, because they are easily overtightened and can damage the optical fibers. HP recommends using Filcrow wraps.

Configuring the 4Gb SAN Switch

The 4Gb SAN Switch must be configured to ensure correct operation within a network and fabric. For instructions about configuring the switch to operate in a fabric containing switches from other vendors, refer to the *HP StorageWorks Fabric OS 5.0 procedures user guide*.

For more information about the Command Line Interface (CLI), refer to the *HP StorageWorks Fabric OS 5.0 command reference guide*.

Items required for configuration

The following items are required for configuring and connecting the 4Gb SAN Switch for use in a network and fabric:

- 4Gb SAN Switch installed and connected to a workstation with an installed terminal emulator, such as HyperTerminal
- Unused IP address and corresponding subnet mask and gateway address
- Serial cable (provided)
- Ethernet cable
- SFP transceivers and compatible optical cables, as required
- Access to an FTP server for backing up the switch configuration (optional)

Configuring the 4Gb SAN Switch requires the following steps:

1. Power up the Switch and log in, page 30.
2. Set the IP address, page 30.
3. Create an Ethernet connection and log in, page 32.
4. Modify the FC domain ID (optional), page 32.
5. Verify the configuration, page 33.
6. Back up the configuration, page 33.

Power up the Switch and log in

1. Once a serial connection is established, provide power to the Interconnect switch.
The power status LED illuminates green, and the Interconnect switch begins running power-on self-test (POST). POST should complete and the switch completes the boot process in about three minutes.
2. After POST is complete, verify that the System Status (4GB SAN Switch) and power status (Interconnect switch) LEDs are green.
3. When the terminal emulator application stops reporting information using a serial connection, press Enter to display the login prompt.
4. Log in using the administrative account; the user name is `admin` and the default password is `password`. Up to two simultaneous admin sessions and four user sessions can be created. For details, refer to the *HP StorageWorks Fabric OS 5.0 procedures user guide* and the *HP StorageWorks Fabric OS 5.0 command reference guide*.

Set the IP address

Replace the default IP address and related information with the information provided by your network administrator. By default, the IP address is set to 10.77.77.77.

1. Type `ipaddrset` at the terminal emulator application prompt.
2. Type the requested information, as prompted.

Example:

```
switch:admin> ipaddrset
Ethernet IP Address [192.168.1.1]:10.32.53.47
Ethernet Subnetmask [255.255.255.0]:255.255.240.0
Fibre Channel IP Address [0.0.0.0]:
Fibre Channel Subnetmask [0.0.0.0]:
Gateway IP Address [0.0.0.0]:10.32.48.1
Set IP address now? [y = set now, n = next reboot]:y
IP address being changed...
Committing configuration...Done.
switch:admin>
```

3. Optionally, verify that the address was correctly set by entering `ipaddrshow` at the command prompt.
4. Record the IP address on the label clearly displayed on the port side of the chassis.
5. If the serial port is no longer required, log out of the serial console by typing `exit` and pressing **Enter**, and then remove the serial cable.

Create an Ethernet connection and log in

Create an Ethernet connection to the 4Gb SAN Switch:

1. Connect an Ethernet cable to the Ethernet port and to the workstation or to an Ethernet network containing the workstation.

After this connection is made, you can access the 4Gb SAN Switch remotely, by command line or by Advanced Web Tools. Ensure that the switch is not being modified from any other connections during the remaining steps.

2. Log in to the switch by telnet, using the admin account.

Modify the FC domain ID (optional)

If desired, you can modify the FC domain ID. The default FC domain ID is domain 1. If the 4Gb SAN Switch is not powered on until after it is connected to the fabric and the default FC domain ID is already in use, the domain ID for the new switch is automatically reset to a unique value. If the switch is connected to the fabric after it has been powered on and the default domain ID is already in use, the fabric segments.

You can determine the domain IDs that are currently in use by typing `fabricshow`. The maximum number of domains with which the 4Gb SAN Switch communicates with is determined by this switch's fabric license.

To modify the domain ID:

1. Disable the switch by typing `switchdisable`.
2. Type `configure`, and then type a new value or press **Enter** to accept each default value.
3. At the Fabric parameters prompt, type **Y** and press **Enter**:

```
Fabric parameters (yes, y, no, n): [no] y
```

4. Enter a unique domain ID. For example:

```
Domain: (1..239) [1] 3
```

5. Complete the remaining prompts or press **Ctrl+D** to accept the remaining default settings.
6. Re-enable the switch by typing `switchenable`.
7. Confirm any changes made to the domain ID by typing `fabricshow`.
8. Optionally, verify switch policy settings and specify any custom status policies that need to change:
 - a. Type `switchstatuspolicyshow` to verify the current policy settings. If desired, change switch policy settings by typing `switchstatuspolicyset` at the prompt. This command sets the policy parameters that determine the overall switch status.

- b. Customize the status policies as desired.
9. To deactivate the alarm for a particular condition, enter **0** at the prompt for that condition.

Verify the configuration

After completing the configuration, use the LEDs and commands to verify that the configuration has been accepted.

1. Check the LEDs to verify that all components are functional.

For information about LED patterns, refer to "[Interpreting LED activity](#)" on page 38.

2. Type `switchshow` to get information about the switch and port status.
3. Type `fabricshow` to get general information about the fabric.

Back up the configuration

HP recommends regular backups to ensure that a recent configuration is available for downloading to a replacement switch, if required. For specific instructions about how to back up the configuration, refer to the *HP StorageWorks Fabric OS 5.0 procedures user guide*.

Back up the switch configuration to an FTP server by typing `configupload` and following the prompts. This command uploads the switch configuration to the server, making it available for downloading to a replacement switch, if necessary.

3 Managing the 4Gb SAN Switch

This chapter provides the following information:

[Management features of the 4Gb SAN Switch](#), page 35

[Maintaining the 4Gb SAN Switch](#), page 37

[Powering the 4Gb SAN Switch on and off](#), page 38

[Interpreting LED activity](#), page 38

[LED locations on the 4Gb SAN Switch](#), page 39

[LED patterns](#), page 39

[POST and boot specifications](#), page 43

[Interpreting POST results](#), page 44

Management features of the 4Gb SAN Switch

The management tools built into the 4Gb SAN Switch (listed in [Table 6](#)), can be used to monitor fabric topology, port status, physical status, and other information used for performance analysis and system debugging.

When running IP over FC, these management tools must be run on both the Fibre Channel host and the switch and must be supported by the Fibre Channel host driver. For a list of Fibre Channel hosts supported by the 4Gb SAN Switch, contact your HP representative.

Table 6 4Gb SAN Switch management features

Management tool	Out-of-band support	In-band support
Command line interface, which supports up to two admin sessions and four user sessions simultaneously. For more information, refer to the <i>HP StorageWorks Fabric OS 5.0 procedures user guide</i> and the <i>HP StorageWorks Fabric OS 5.0 command reference guide</i> .	Ethernet or serial connection	IP over FC
Advanced Web Tools For information, refer to the <i>HP StorageWorks Advanced Web Tools 5.0 user guide</i> .	Ethernet connection	IP over FC
Standard SNMP applications For information, refer to the <i>HP StorageWorks Fabric OS 5.0 MIB reference guide</i> .	Ethernet connection	IP over FC
Management server For more information, refer to the <i>HP StorageWorks Fabric OS 5.0 procedures user guide</i> and the <i>HP StorageWorks Fabric OS 5.0 command reference guide</i> .	Ethernet connection	SMI-S compliant management program

You can connect a management station to one switch via Ethernet while managing other switches connected to the first switch via FC. To do so, set the FC gateway address of each of the other switches to be managed to the FC IP address of the first switch. The gateway address of the first switch should be set to what ever the gateway address is for the subnet that the first switch resides on.

For example:

	Management station	First switch	Second switch	Third switch
Ethernet	192.168.1.09	192.168.1.10	204.1.1.11	204.1.1.12
FCIP	192.168.65.09	192.168.65.10	192.168.65.11	192.168.65.12
Gateway	192.168.1.10	any, not self	192.168.1.10	192.168.1.10

The disadvantage of this method is the management station cannot address anything but the switches.

Maintaining the 4Gb SAN Switch

The 4Gb SAN Switch does not require any regular physical maintenance.

Ensure that the environmental conditions, described in “[Technical specifications](#)” on page 51, are met. This helps prevent failure of the switch due to stress or abuse.

Removing an SFP Transceiver

In some cases you might need to remove an SFP transceiver, either because it is no longer needed or because you must replace it. To remove SFP transceivers:

1. Press and hold the cable release.
2. Remove the cable from the transceiver.
3. Pull the bail (wire handle) to release the transceiver.
4. Grasp the bail, and gently but firmly pull the transceiver out of the port.



CAUTION: If the SFP transceiver you are removing does not have a bail, use a small implement, such as a screwdriver, to press the release trigger beneath the port. Non-bailed SFP transceivers are not recommended because they can be damaged by the removal process. Refer to the *HP StorageWorks SAN design reference guide* for a list of supported SFP transceivers and devices.

5. Repeat this procedure for the remaining ports as required.

Diagnostic tests

In addition to POST, Fabric OS 5.0 includes diagnostic tests to help troubleshoot the hardware and the firmware including tests of internal connections and circuitry, fixed media, and the transceivers and cables in use.

The tests are initiated by command, either through a telnet session or through a terminal setup for a serial connection to the switch. Some tests require the ports to be connected by external cables to allow diagnostics to verify the serializer/deserializer interface, transceiver, and cable. For information on available diagnostic tests, type `diagHelp`.

All diagnostic tests are run at link speeds of 1 Gb/sec, 2 Gb/sec, and 4 Gb/sec.



CAUTION: Diagnostic tests can temporarily lock the transmit and receive speed of the links during diagnostic testing.

For information about specific diagnostic tests, refer to the *HP StorageWorks Fabric OS 5.0 procedures user guide* or type `help` followed by the name of the diagnostic test.

Powering the 4Gb SAN Switch on and off

Once the 4Gb SAN Switch is connected to the Interconnect switch, power up the Interconnect switch; power will subsequently be provided to the 4Gb SAN Switch. The 4Gb SAN Switch will run POST by default each time it is powered on, reset, or rebooted. The POST process can last as long as three minutes.

To remove power from the 4Gb SAN Switch, power down the Interconnect switch.



NOTE: Each time an Interconnect switch is powered on, its settings are restored to the last saved configuration. An attached 4Gb SAN Switch would subsequently power on and also restore its settings to the last saved configuration.

Interpreting LED activity

You can monitor system activity and status through the activity of the LEDs on the 4Gb SAN Switch.

There are three possible LED states: no light, a steady light, and a flashing light. The steady lights and flashing lights can be green or amber.

The LEDs flash any of these colors during boot, POST, or other diagnostic tests. This is normal and does not indicate a problem unless the LEDs do not indicate a healthy state after all boot processes and diagnostic tests are complete. A healthy state is indicated by a steady green light. See [Table 7](#) on page 40 for details about LED activity.

LED locations on the 4Gb SAN Switch

All 4Gb SAN Switch LEDs are located on the port side. They include:

- Switch Status
- Port Status
- Port Speed
- Ethernet Status
- Ethernet Speed

Figure 9 shows the front side of the 4Gb SAN Switch.

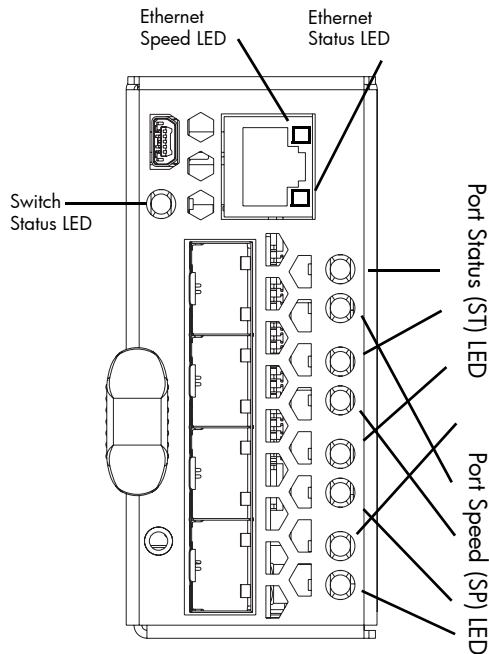


Figure 9 4Gb SAN Switch LED locations

LED patterns

Table 7 and Table 8 summarize LED location, color, and meaning, as well as any recommended user response.

Switch status LED patterns

The system and power LED patterns are shown in [Table 7](#)

Table 7 Switch Status LED patterns during normal operation

LED name, location	LED color	Status of hardware	Recommended action
Switch Status LED <i>located below miniature serial port</i>	No light	Switch is off, boot is not complete, or boot failed.	Verify that switch is on and has completed booting.
	Steady green	Switch is on and functioning.	No action required.
	Flashing green (on 1 second, off 1 second)	One or both of the following are true: <ul style="list-style-type: none">• One or more environmental ranges are exceeded.• Error log contains one or more port diagnostic error messages.	Check environmental conditions, error log, Port Status LEDs, transceivers, cables, and loopback plugs. Correct error condition. Clear error log. Rerun diagnostics to verify fix.
	Amber	Amber for longer than 5 seconds indicates a failure.	Needs attention.

Port LED patterns

Each port has two LEDs: the upper LED is a port status indicator, and the lower LED is a port speed indicator. [Table 8](#) shows the LED location, color, meaning, and recommended action for these port LEDs.

Table 8 Port status and Port Speed LED patterns during normal operation

LED name, Location	LED color	Status of hardware	Recommended action
Port Status <i>upper LED to the right of port</i>	No light	No light or signal carrier (transceiver or cable) detected.	Check transceiver and cable.
	Steady green	Port is online (connected to external device) but has no traffic.	No action required.
	Slow-flashing green (on 1 second, off 1 second)	Port is online but segmented, indicating a loopback cable or incompatible switch.	Verify that the correct device is connected to port and that the switch and port settings are correct.
	Fast-flashing green (on 1/4 second, off 1/4 second)	Port is in internal loopback (diagnostic).	No action required.
	Flickering green	Port is online with traffic flowing through port.	No action required.
	Steady amber	Port is receiving light or signal carrier, but is not yet online.	No action required.

Table 8 Port status and Port Speed LED patterns during normal operation (continued)

LED name, Location	LED color	Status of hardware	Recommended action
	Slow-flashing amber (on 1 second, off 1 second)	Port is disabled as a result of diagnostics or <code>portDisable</code> command. If the LEDs for all ports are slow-flashing amber, the switch could be disabled.	Enable the port using the <code>portEnable</code> command; refer to <i>HP StorageWorks Fabric OS 5.0 command reference guide</i> for more information. If the LEDs for all ports are slow-flashing amber, enable the switch by entering the <code>switchEnable</code> command.
	Fast-flashing amber (on 1/4 second, off 1/4 second)	Port is faulty.	Check the Port Status LEDs, error log, transceiver, and cable or loopback plug. Clear the error log. Rerun the diagnostics to verify that the error condition is fixed.
	Alternating green and amber	Port is bypassed.	Check configuration of FC loop.
Port Speed lower LED to the right of port	No light	Port is transmitting/receiving at 1 Gb/sec.	No action required.
	Steady green	Port is transmitting/receiving at 2 Gb/sec.	No action required.
	Steady amber	Port is transmitting/receiving at 4 Gb/sec	No action required.

Ethernet LED patterns

Each Ethernet port has two LEDs, described in [Table 9](#).

Table 9 Ethernet LED patterns

LED name, location	LED color	Status of hardware	Recommended action
Ethernet Speed <i>located at upper right of Ethernet port</i>	No light	Port speed is 10 Mb/sec.	No action required.
	Steady green	Port speed is 100 Mb/sec.	
Ethernet Link <i>located at lower right of Ethernet port</i>	No light	No link.	Establish link.
	Amber	Link is valid.	No action required.
	Blinking green	Traffic.	No action required.

POST and boot specifications

The 4Gb SAN Switch performs POST when it is turned on or rebooted. Total boot time with POST is approximately three minutes.

POST can be omitted for subsequent reboots by using the `fastboot` command. For more information about this command, refer to the *HP StorageWorks Fabric OS 5.0 command reference guide*. If you suspect a problem with the switch, enable POST to obtain more information on any failure.

POST

The success/failure results of the diagnostic tests that run during POST can be monitored through the error log or the command line interface.

POST includes the following steps:

- Preliminary POST diagnostics are run.
- Operating system is initialized.
- Hardware is initialized.
- Diagnostic tests are run on several functions, including circuitry, port functionality, memory, statistics counters, and serialization.

Boot

Boot completes in approximately three minutes if POST is run. Boot includes the following tasks after POST is complete:

- Universal port configuration is performed.
- Links are initialized.
- Fabric is analyzed, and if any ports are connected to other switches, the 4Gb SAN Switch participates in a fabric configuration.
- The 4Gb SAN Switch obtains a domain ID and assigns port addresses.
- Unicast routing tables are constructed.
- Normal port operation is enabled.

Interpreting POST results

POST is a system check that is performed each time the switch is powered on, rebooted, or reset. During POST, the LEDs flash different colors. Any errors that occur during POST are listed in the error log.

To determine whether POST completed successfully and whether any errors were detected:

1. Verify that the 4Gb SAN Switch LEDs indicate all components are healthy. See [Table 8](#) on page 41 for description and interpretation of LED patterns. If one or more LEDs do not display a healthy state, verify that the LEDs on the switch are not set to “beacon” using the `switchshow` command.
2. Verify that the 4Gb SAN Switch prompt appears on the terminal of a computer workstation connected to the switch. If there is no switch prompt when POST completes, press **Enter**. If the switch prompt still does not appear, try opening another telnet session or another management tool. If this is not successful, the 4Gb SAN Switch did not successfully complete POST; contact your switch supplier for repair.
3. Review the switch system log for errors. Any errors detected during POST are written to the system log, accessible through the `errshow` command.

For information about all referenced commands and accessing the error log, refer to the *HP StorageWorks Fabric OS 5.0 procedures user guide*. For information about error messages, refer to the *HP StorageWorks Fabric OS 5.0 diagnostic and system error messages reference manual*.

A Regulatory compliance notices

This appendix covers the following topics:

- [FCC EMC \(Electromagnetic compatibility\) statement \(USA\)](#), page 45
- [EMC statement \(Canada\)](#), page 45
- [European Union notice](#), page 45
- [Laser safety](#), page 46
- [Laser safety](#), page 46
- , page 47

FCC EMC (Electromagnetic compatibility) statement (USA)

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Cables

Connections to this device must be made with shielded cables with metallic RFI/EMI connector hoods in order to maintain compliance with FCC Rules and Regulations.

EMC statement (Canada)

This Class A digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.

Cet appareil numérique de la Classe A respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada.

European Union notice

This product complies with the following EU Directives:

- Low Voltage Directive 73/23/EEC
- EMC Directive 89/336/EEC

Compliance with these directives implies conformity to applicable harmonized European standards (European Norms) which are listed on the EU Declaration of Conformity issued by Hewlett-Packard for this product or product family.

This compliance is indicated by the following conformity marking placed on the product:



Laser safety

A. Certification and classification information

This product contains a laser internal to the small form-factor pluggable (SFP) transceiver modules.

In the USA, the SFP module is certified as a Class 1 Laser product, conforming to the requirements contained in Department Of Health and Human Services (DHHS) regulation 21 CFR, Subchapter J. The certification is indicated by a label on the metal SFP housing.

Outside the USA, the SFP is certified as a Class 1 Laser product conforming to requirements contained in IEC 825-1:1993 and EN60825-1:1994, including Amendment 11:1996.

The SFP includes the following certifications:

- UL Recognized Component (USA)
- CSA Certified Component (Canada)
- TUV Certified Component (European Union)
- CB Certificate (Worldwide)
- The following figure shows the Class 1 information label that appears on the metal housing of the SFP.

CLASS 1 LASER PRODUCT 21 CFR(J)

B. Product information

Each communications port consists of a transmitter and receiver optical subassembly. The transmitter subassembly contains internally a semiconductor laser diode in the wavelength of either 850 nanometers (shortwave laser) or 1310 nanometers (longwave laser).

Class 1 Laser products are not considered hazardous.

C. Usage restrictions

Failure to comply with these usage restrictions may result in incorrect operation of the system and points of access may emit laser radiation above the Class 1 limits established by the IEC and U.S. DHHS.



WARNING! Use of controls or adjustments or performance of procedures other than those specified herein or in the laser product's installation guide may result in hazardous radiation exposure. To reduce the risk of exposure to hazardous radiation, do not try to open the module enclosure. There are no user-serviceable components inside. Do not operate controls, make adjustments, or perform procedures to the laser device other than those specified herein. Allow only HP-authorized Service technicians to repair the unit.

B Electrostatic discharge

To prevent damaging the system, be aware of the precautions you need to follow when setting up the system or handling parts. A discharge of static electricity may damage system boards or other static-sensitive devices. This type of damage may reduce the life expectancy of the device.

To prevent electrostatic damage, observe the following precautions:

- Avoid hand contact by transporting and storing products in static-safe containers.
- Keep electrostatic-sensitive parts in their containers until they arrive at static-free workstations.
- Place parts on a grounded surface before removing them from their containers.
- Avoid touching pins, leads, or circuitry.
- Always make sure you are properly grounded when touching a static-sensitive component or assembly.

Grounding methods

There are several methods for grounding. Use one or more of the following methods when handling or installing electrostatic-sensitive parts:

- Use a wrist strap connected by a ground cord to a grounded workstation or computer chassis. Wrist straps are flexible straps with a minimum of 1 megohm \pm 10 percent resistance in the ground cords. To provide proper ground, wear the strap snug against the skin.
- Use heel straps, toe straps, or boot straps at standing workstations. Wear the straps on both feet when standing on conductive floors or dissipating floor mats.
- Use conductive field service tools.
- Use a portable field service kit with a folding static-dissipating work mat.

If you do not have any of the suggested equipment for proper grounding, contact HP customer service or have an HP-authorized reseller install the part.



NOTE: For more information on static electricity, or for assistance with product installation, contact your HP-authorized reseller.

C Technical specifications

This appendix provides the following information:

- [Data transmission ranges](#), page 51
- [External FC port specifications](#), page 52
- [Serial port specifications](#), page 52
- [Weight and physical dimensions](#), page 53
- [Memory specifications](#), page 53
- [Supported SFP transceivers](#), page 53
- [Facility requirements](#), page 53
- [Environmental requirements](#), page 54
- [Supported HBAs](#), page 54
- [System specifications](#), page 55

Data transmission ranges

Table 10 provides the data transmission ranges for different cable types and port speeds.

Table 10 Laser data transmission ranges

Port speed	Cable	Short wavelength	Long wavelength
1 Gb/sec	50 μ	500 m (1,640 ft)	n/a
1 Gb/sec	62.5 μ	300 m (984 ft)	n/a
1 Gb/sec	9 μ	n/a	10 km (6.2 miles). Long Wave SFP transceivers are required.
2 Gb/sec	50 μ	300 m (984 ft)	n/a
2 Gb/sec	62.5 μ	150 m (492 ft)	n/a

Table 10 Laser data transmission ranges (continued)

Port speed	Cable	Short wavelength	Long wavelength
2 Gb/sec	9μ	n/a	10 km (6.2 miles) without an HP Extended Fabrics license; 50 to 100 km with an HP Extended Fabrics license.
4Gb/sec	50μ	150 m (492 ft.)	n/a
4Gb/sec	62.5μ	70 m (230 ft.)	n/a

External FC port specifications

- The external FC ports in the 4Gb SAN Switch are compatible with SWL and LWL SFP transceivers. The ports are compliant with the Small Form Factor Pluggable (SFP) transceiver Multi-Source Agreement (MSA), September 2000, and support serial diagnostics.
- The ports meet all required safety standards. For more information about these standards, see ["Regulatory compliance notices"](#) on page 45.
- The external ports are capable of operating at 4.25 Gb/sec, 2.125 Gb/sec, or 1.0625 Gb/sec, and are able to autosense the highest speed of which all attached devices are capable.
- ## Serial port specifications
- The serial port is located on the port side of the switch. It is a three-wire RS-232 port with a miniature serial connector, designed to connect to a DTE port.
- The serial port can be used to connect to a computer workstation to configure the switch IP address without connecting to the fabric. The serial port's parameters are 9600 baud, 8 data bits, no parity, 1 stop bit, and no flow control.
- The port requires a straight (extension) serial cable with a miniature serial connector.

Weight and physical dimensions

Table 11 lists the physical dimensions of the 4Gb SAN Switch.

Table 11 4Gb SAN Switch physical dimensions

Height	8.66 cm (3.410 in)
Width	3.87 cm (1.525 in)
Depth	13.02 cm (5.125 in) excluding handle
Weight	.36 kg (.8 lb)

Memory specifications

The 4Gb SAN Switch memory specifications are shown in Table 12.

Table 12 Memory specifications

Memory type	Installed memory
Main memory (DDR SDRAM)	128 MB
Kernel flash	16 MB
Boot flash	4 MB
Compact flash	256 MB

Supported SFP transceivers

SFP transceivers have been tested and are known to work with the 4Gb SAN Switch. See "[Optional hardware kits](#)" on page 19 for a list of supported SFP transceivers. Do not use nonsupported SFP transceivers, because these can affect switch operability. They might not fit correctly and could void your warranty.

For a complete list of supported devices, contact your local HP representative.

Facility requirements

To ensure correct operation of the 4Gb SAN Switch, the ambient air temperature at the front of the BladeSystem enclosure should not exceed 35°C while the switch is operating. The air vents of the Interconnect switch should not be blocked or restricted. The air vents of the 4Gb SAN Switch should not be blocked or restricted.

Power requirements

The 4Gb SAN Switch receives all necessary power from the Interconnect switch. No other power requirement or provision exists.

Environmental requirements

To ensure proper operation, the 4Gb SAN Switch must not be subjected to environmental conditions beyond those for which it was tested. Acceptable environmental ranges for operating and nonoperating conditions are listed in [Table 13](#).

Table 13 Environmental requirements

Condition	Acceptable range during operation	Acceptable range during non-operation
Temperature	10° to 35°C (50° to 95°F)	-30° to 60°C (-22° to 140°F)
Humidity	20% to 85% RH noncondensing, at 35°C, with maximum gradient of 10% per hour	10% to 85% RH noncondensing, at 70° C
Altitude	3 km (0 to 10,000 ft) above sea level	12 km (0 to 39,370 ft) above sea level
Vibration	0.5 G, 5–500 Hz	2.0 G, 5–500 Hz
Air flow	Normal: provided by enclosure	None required

The 0° to 35° Celsius range applies to the ambient air temperature at the air intake vents into the Interconnect switch at the front of the BladeSystem enclosure. If the internal temperature range exceeds the operating ranges of the components, the LEDs, error messages, and Fabric Watch alerts indicate a problem. Enter the `tempshow` or Fabric Watch commands to view temperature status.

Supported HBAs

For a list of HBAs supported by the external ports of the 4Gb SAN Switch, contact your local HP Representative.

System specifications

Table 14 lists the system specifications for the 4Gb SAN Switch.

Table 14 System specifications

Specification	Description
Configurable port types	F_Port, FL_Port, and E_Port
System architecture	Nonblocking shared-memory switch
System processor	PPC440GP, 200 MHz CPU
ANSI FC protocol	FC-PH (Fibre Channel Physical and Signalling Interface standard)
Modes of operation	FC Class 2, Class 3, Class F
Fabric initialization	Complies with FC-SW 5.0
FC-IP (IP over Fibre Channel)	Complies with FC-IP 2.3 of FCA profile
Aggregate switch I/O bandwidth	40 Gb/sec if all 10 ports are running at 2 Gb/sec, full duplex. There are a total of 12 Switch Ports. The 8 internal switch ports (0–7) will run at 2 Gb/sec and the 4 external ports (8–11) run at 4 Gb/sec for a total of 16+16 or 32 Gb/sec full duplex.

Table 14 System specifications (continued)

Specification	Description
Port-to-port latency	Less than 2 microseconds with no contention (destination port is free)
EMC (electromagnetic compatibility)	<p>Emissions</p> <p>An operating 4Gb SAN Switch conforms to the emissions requirements specified by the following regulations:</p> <ul style="list-style-type: none">• FCC Rules & Regulations, Part 15 subpart B, Class A• CISPR22 Class A• EN55022 Class A• VCCI Class A ITE• AS/NZS 3548 Class A• CNS13438 Class A• ICES-003 Class A <p>Immunity</p> <ul style="list-style-type: none">• IEC 61000-4-2 Severity Level 3 for Electrostatic Discharge• IEC 61000-4-3 Severity Level 3 for Radiated Fields• IEC 61000-4-4 Severity Level 3 for Fast Transients• IEC 61000-4-5 Severity Level 3 for Surge Voltage• IEC 61000-4-6 Conducted Emissions• IEC 61000-4-11 Voltage Variations

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